

Robotic-assisted lung biopsy: a preliminary experience

e-Poster: P-277

Congress: CIRSE 2010

Type: Scientific Poster

Topic: Oncologic intervention

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Keyword: Robotics; Lung Biopsy; CT; Dosimetry

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1. Purpose

To assess the technical efficacy and feasibility of a computerized robotic biomedical system to perform CT guided interventional radiology lung biopsies (S.I.R.I.O.), leading to a procedure time, scanning number and radiation dose reduction.

S.I.R.I.O.

SIRIO is planned to ensure supporting instruments in SIRIO is planned to ensure supporting instruments in minimally invasive recent techniques to medical staff, identifying the probe path in reaching small size lesions (less than 1 cm).

2. Materials/Methods

- 80 consecutive patients
- presenting coin lesion
- needed to be histologically defined
- Without severe comorbidities
- Good performance status

Group A:

- 90 consecutive patients
- Underwent standard lung biopsy
- Mean age 69 yrs (49-85yrs)
- 30 men-10 women
- Mean lesion size: 4.32cm
- Obtained consensus

Group B:

- 90 consecutive patients
- Underwent SIRIO assisted lung biopsy
- Mean age 65 yrs (50-84yrs)
- 65 men-25 women
- Mean lesion size: 3.37cm
- Obtained standard consensus and SIRIO study consensus

DATA

- Procedural time: from local anesthesia to target achievement.
- Dosimetry: mGy necessary to reach the lesion
- Scansion number: necessary to reach the lesion

SIRIO and its components: CT and optic sensor



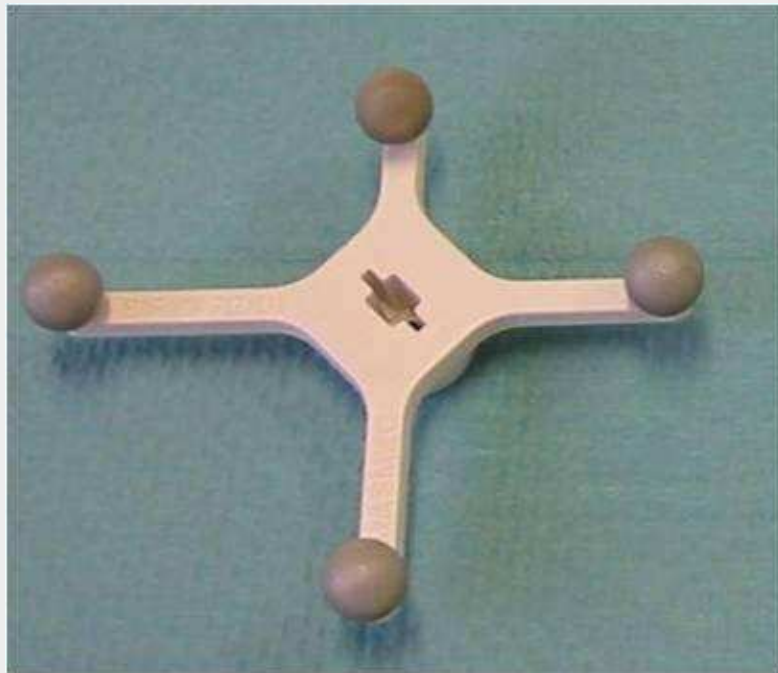
Visualization and elaboration unit



Infrared optic sensor



Needle tool



Patient tool



Tracking with needle



3. Results

PROCEDURAL TIME

Group A: 22 (+/-9)min

Group B: 13 (+/-7)min

CT SCAN NUMBER

Group A: 10

Group B: 6

DOSIMETRY

Group A: mGy 64

Group B: mGy 33

SPECIFICITY

Group A: 93%

Group B: 96%

SIRIO-guided procedure



4. Conclusion

It's possible to verify a **significant difference** in **time procedure, scans number** and **radiation dose**. The necessary time to perform a biopsy with S.I.R.I.O. is lower than traditional system (about 13 minutes for each S.I.R.I.O. procedure vs 24 minutes for traditional method), with 5 scans for SIRIO procedure vs 10 scans for traditional procedure, and 34 mGy of radiation dose for SIRIO vs 61mGy for traditional biopsies.

In conclusion SIRIO reduces Patient discomfort and Costs (direct and indirect)

5. Reference

- Cleary et al, Interventional Robotic Systems: Applications and technology state of the art. Minimally Invasive therapy.2006;15:101-13.

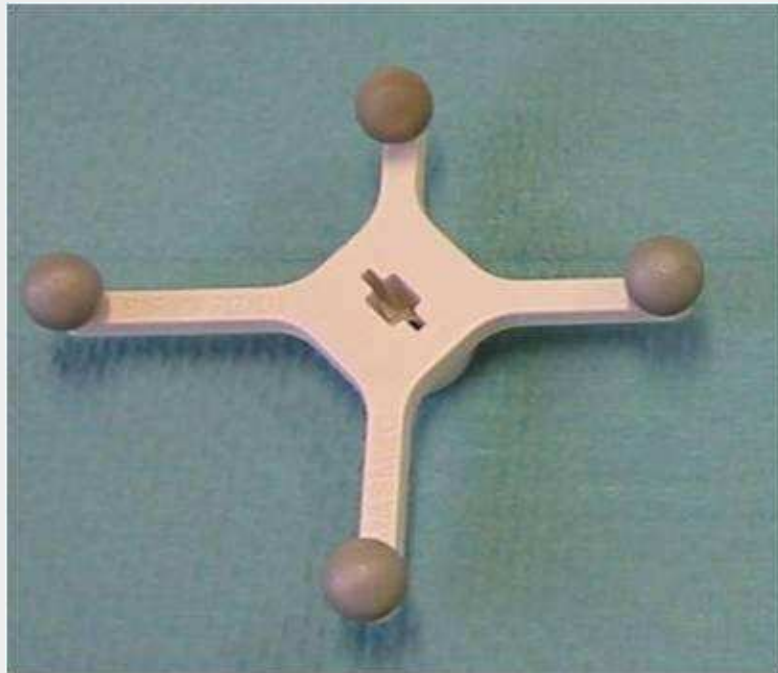
- Stoianovici et al, A modular surgical robotic system for image guided percutaneous procedures. *Medical Image Computing and Computer-Assisted Intervention*. Springer Verlag;1998:404-10.
- Priola A et al, Biopsia Transtoracica percutanea TC-guidata di lesioni polmonari: variabili che influenzano l'accuratezza diagnostica. *Radiologia medica* 2007;112:1142-1159.
- Ohno et al, CT-guided transthoracic needle aspiration biopsy of small (<20mm) solitary pulmonary nodules. *AJR* 2003;180:1665-1669.

6. Mediafiles

Infrared optic sensor



Needle tool



Patient tool



SIRIO-guided procedure



SIRIO and its components : CT and optic sensor



Tracking with needle



Visualization and elaboration unit

